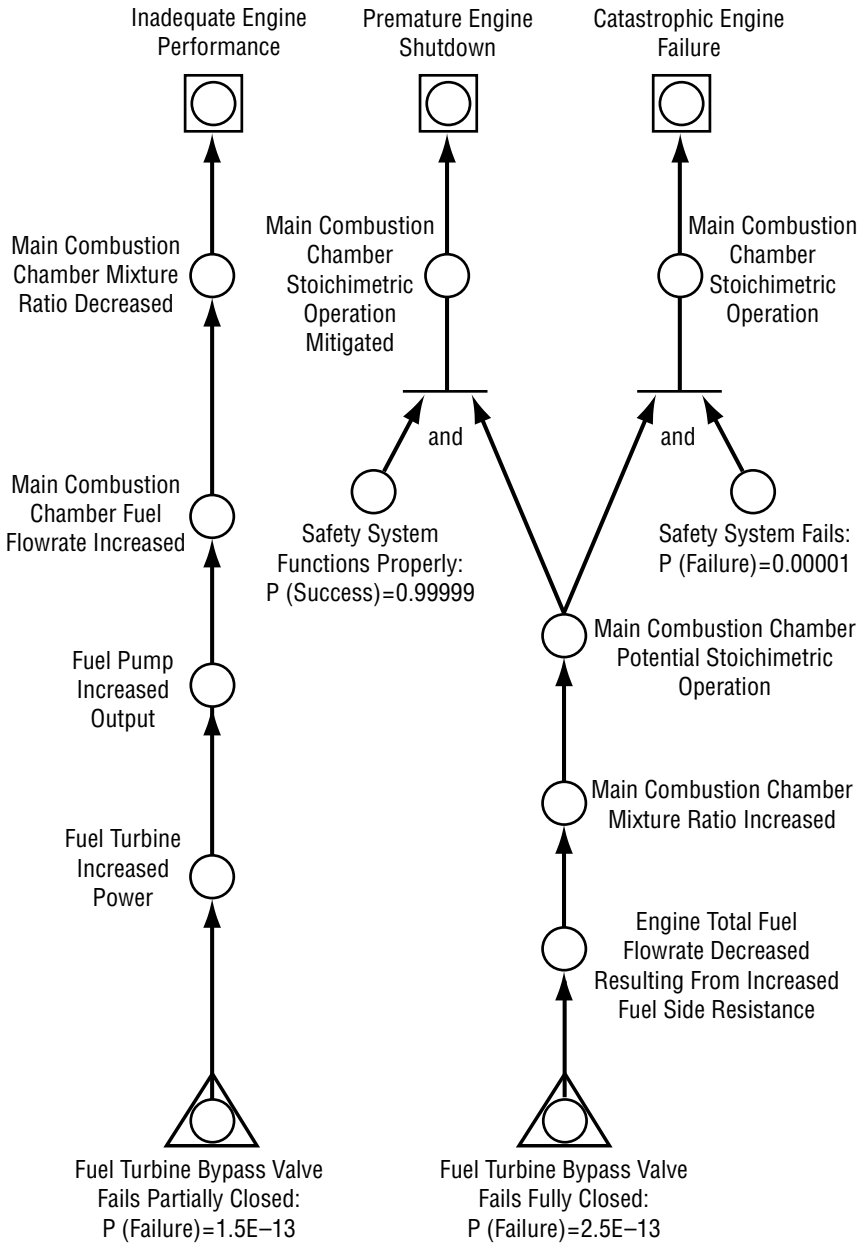

Figure 33.—Fuel turbine bypass valve partial failure propagation logic model.

engine performance, premature engine shutdown, and catastrophic engine failure are determined.

Recent efforts have focused on developing failure logic models for reusable launch vehicle (RLV) and electromechanical actuator concepts. These efforts demonstrate the applicability of the failure propagation modeling approach and have identified information resources needed for propulsion system model development.

Failure logic incorporated into these models was acquired from system configuration information, engineering expertise, description of health management functions, applicable failure reports, and existing failure assessments. Quantification of these conceptual design failure logic models was from four data sources: test data, quality data, operational data derived from systems similar to the conceptual design, and a priori estimates made from an engineering assessment of the conceptual design and related existing systems. Currently, additional data sources and applicable reliability metrics are being identified. Propulsion system concept design failure propagation logic models developed to date have demonstrated the feasibility of using these models for design reliability assessment and have resulted in the incorporation of this approach into current propulsion system development plans.

Propulsion system design reliability models will benefit NASA and the aerospace industry by providing designers a tool to better understand the failure environment of their designs, to assess the design against reliability requirements, and to focus reliability related design modifications to high-risk design elements. This capability will result in more reliable and dependable propulsion systems.

Sponsor: Reusable Launch Vehicle Program Office

Industry Involvement: Sverdrup Technology Incorporated, Huntsville Office

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